

# *EUPROTOMICROIDES ZANTEDESCHIA*, A NEW GENUS AND SPECIES OF PIGMY DALATIID SHARK FROM SOUTH AFRICA

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## ABSTRACT

A small dalatiid shark, trawled off the west coast of South Africa in about 300 fathoms, is described and assigned to a new genus and species.

## INTRODUCTION

Among a large quantity of material donated to the South African Museum during 1963 by the Cape Town trawler ARUM was a single example of a very small shark that was preliminarily identified as *Heteroscymnoides marleyi* Fowler. On re-examination, however, it was found that the little shark's preliminary identification was incorrect, and it could not be placed in any of the known dalatiid genera.

The most recent review of the squaloid sharks (Bigelow & Schroeder, 1957) places seven genera in the Dalatiidae, five of which are monotypic, one has two species, and only one genus, *Somniosus*, has several species.

The present specimen differs as much from any of the known genera as they do from each other, and it seems necessary to define another monotypic genus.

## ***Euprotomicroides*, gen. nov.**

*Diagnosis*.—A genus of dalatiid sharks that can be distinguished from all other members of the family by the following combination of characters: Spines absent on both dorsal fins; gill slits large, the largest (fifth) about equal to base of first dorsal fin; caudal lacking subterminal notch or precaudal pit; first dorsal about midway between snout and caudal origin; second dorsal only slightly longer than first; teeth dissimilar in the two jaws.

*Relationship*.—The genus resembles *Euprotomiscrus* in general shape but differs in having a more robust body, the dorsal fins of more equal size, and larger gill slits.

## ***Euprotomicroides zantedeschia*, sp. nov.**

Figures 1-4

*Diagnosis*.—Gill openings large, vertical, arranged in horizontal series anterior to pectoral origin; length of gill slits increasing in size from the

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first to the fifth, the first 1.7 and the fifth 0.9 in horizontal diameter of eye, the length of the fifth gill slit greater than the distance first to fifth gill slits; interspaces between gill slits subequal, that between the first and second greater than that between any other two gill slits. Second dorsal only slightly longer than first dorsal, origin of second dorsal above origin of pelvics.

Dermal denticles small, quadrate, close-packed but not overlapping, covering the whole of the body with the exception of the extremities of the fins, but larger and more closely packed on the ventral surface of the snout, lower lip, and belly than on rest of body. Each denticle has ridges arising from the basal plate to form a posteriorly situated crown, with concave centre forming a pit; lateral/posterior ridges may or may not possess a shelf along their border; the lateral ridges and posterior ridges may be well developed, almost forming lateral and posterior spines.

Teeth:  $\frac{13-1-13}{18-1-18}$ , dissimilar in the two jaws.

*Description.*—Detailed proportional measurements appear in Table 1. All measurements were made with needle point dividers, measuring the actual straight line distance between the two points of reference. To obviate errors due to distortion of the specimen, all measurements which had as one or both of the points of reference a paired character (*i.e.*, eyes, nostrils, paired fins) were measured on both sides and the mean of the two measurements was used.

Characters mentioned in the diagnosis are repeated in the description only where greater clarification is required.

Trunk moderately stout, sub-circular in cross-section anteriorly, but increasingly laterally compressed posteriorly; dorsal profile moderately arched, the ventral profile suddenly becoming less deep posteriorly in the region of the pelvics. A dorsal groove extending from level of pectoral origin to second dorsal, deeper between first and second dorsals than anteriorly; ventral groove absent. Height of trunk at origin of pectoral one-sixth of its length to origin of caudal. Caudal peduncle compressed, with lateral keels or precaudal pits.

Head bulbous, sub-circular in section, with a bluntly rounded, sub-conical snout, as wide as deep at its base. Head measured to first gill slit 3.9 in length to caudal origin and about equal to the interspace between the dorsals. Interorbital distance 2.4 in head; tip of snout to eye short, 4.1 in length of head; but preoral moderately long, 1.7 times horizontal diameter of eye. Outline of snout smoothly rounded between nostrils; eye large, oval, horizontal diameter about twice vertical, its horizontal diameter 0.9 in snout length and 3.5 in head length. Spiracle large, vertical, its length 3 in horizontal diameter of eye, and placed at the same level as the dorsal edge of the eye and behind it by a distance slightly

TABLE 1  
BODY PROPORTIONS IN MM AND IN PER CENT OF LENGTH TO CAUDAL ORIGIN

Description	Empirical lengths (mm)	Empirical length expressed as thousandths of total length
Total length	176.0	
Trunk at pectoral origin:		
breadth	16.5	93
height	24.0	136
Snout length in front of:		
outer nostrils	2.0	11
mouth	16.5	93
Eye:		
horizontal diameter	10.0	57
vertical diameter	4.6	26
Mouth:		
breadth	15.0	85
height	5.0	28
Nostrils:		
breadth between inner corners	7.5	43
Labial furrow length:		
upper	6.0	34
Gill openings:		
first	5.8	33
fifth	11.5	65
First dorsal fin:		
vertical height	5.0	28
length of base	11.0	63
Second dorsal fin:		
vertical height	8.5	48
length of base	13.5	77

more than the spiracular length; spiracle divided by a vellum. Nostrils small, slightly oblique, placed well anterior on ventral surface of snout and close to lateral margins; internasal distance 1.3 in horizontal diameter of eye; each nasal aperture divided into two by the small anterior and large posterior nasal flaps, the anterior aperture smaller in diameter than the posterior. Mouth broad and arched, its width about equal to preoral length of snout; preoral cavities long, deeply incised and straight; length of the anterior portion of each cavity, measured from the angle of the jaw along the jaw, more than half the distance to the symphysis. Lower labial folds absent.

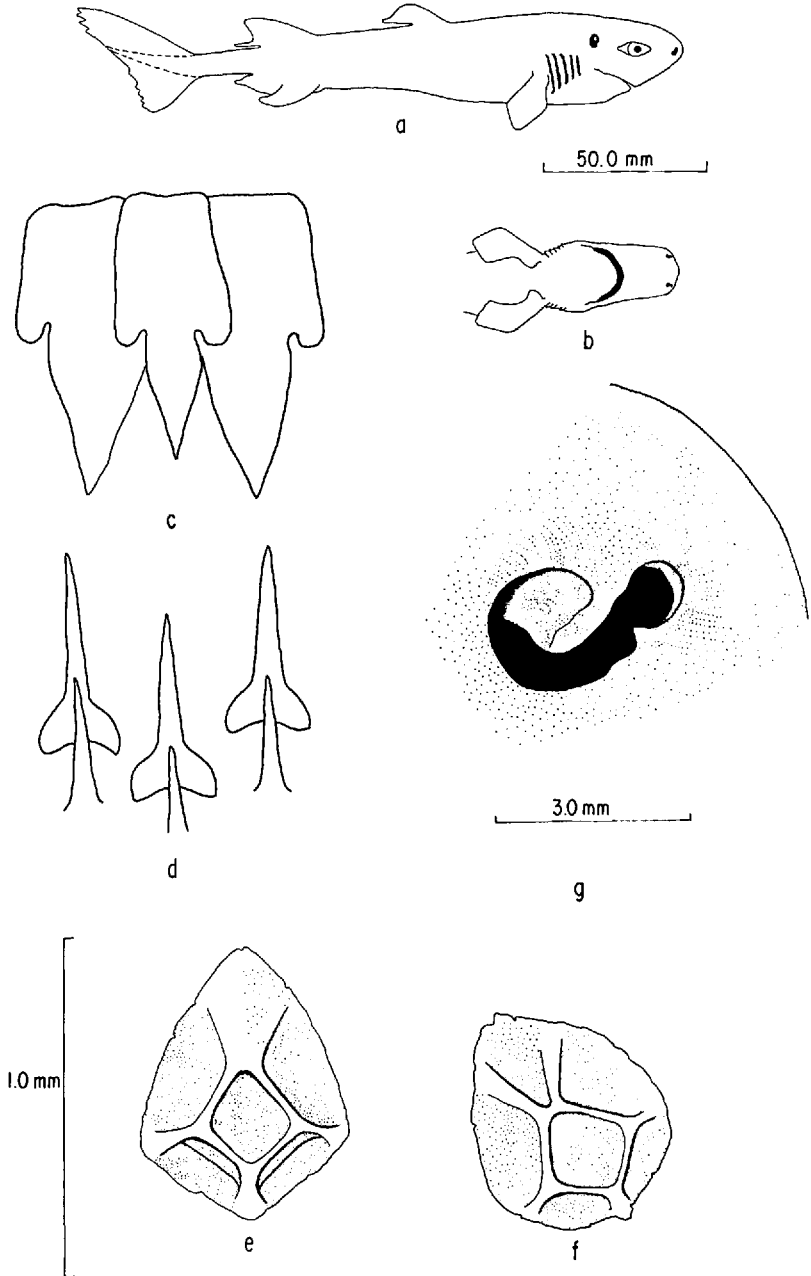
Upper teeth simple, erect, needle-like, arranged in regular antero-posterior rows, two rows functional. Teeth towards angle of jaw smaller

TABLE 1 (Continued)

Description	Empirical lengths (mm)	Empirical length expressed as thousandths of total length
Caudal fin:		
upper margin	36.5	207
lower anterior margin	18.0	102
Pectoral fin:		
anterior margin	17.0	97
distal margin	9.1	52
posterior margin	14.0	79
origin to lobe tip	6.0	34
Pelvic fin:		
anterior margin	13.0	74
posterior margin	3.0	17
Distance from snout to:		
eye	8.5	48
first gill slit	35.0	199
fifth gill slit	41.5	236
first dorsal origin	71.5	406
second dorsal origin	105.0	596
upper caudal	138.0	783
pectoral	43.5	247
pelvic	99.5	566
Interspace between:		
first and second dorsals	27.5	156
second dorsal and caudal	21.0	119
pelvic and caudal	16.0	91
Distance from origin of to origin of:		
pectoral and pelvic	60.0	341
pelvic and caudal	30.0	171
pectoral and first dorsal	28.0	159

than those at symphysis, with broader bases and slightly oblique. Lower teeth blade-like, smooth-edged, with high triangular cusps. Each cusp, except median, slightly oblique and notched laterally where cusp joins base. Teeth at angle of jaw smaller, more oblique and more acutely notched than those medially placed. A single series of teeth functional, with the base of the median tooth overlapping the base of the first tooth on each side, and the base of each adjacent tooth similarly overlapping with its lateral neighbour.

First dorsal small, lacking a spine, originating from the dorsal profile at a small angle; upper anterior angle rounded, posterior angle sharp, anterior and posterior margins convex; origin of fin well posterior to pectorals, the distal end of pectoral falling short of dorsal origin, when



the former is depressed on body sides; distance from tip of snout to first dorsal origin 1.9 in length to caudal origin; height of first dorsal 2.2 in its base, which is 3.2 in length of head.

Second dorsal similar to first but larger, its base 1.2 times as long as base of first dorsal and height 1.5 of first dorsal; origin of second dorsal above origin of pelvics, the posterior tip of second dorsal extending well beyond posterior tip of pelvics.

Caudal fin asymmetrical, the anterior margin of hypural lobe twice epiural margin, and hypural lobe originating a spiracle's length anterior to epiural lobe; the apex rounded and bluntly pointed, the posterior margin slightly concave; no notch present. Caudal axis only slightly upturned.

Pectoral fin originating immediately posterior to fifth gill slit, about half distance tip of snout to first dorsal origin; pectorals 2.1 in length of head; anterior margin slightly convex, posterior margin straight but lobed at pectoral origin, distal margin straight, anterior angle broadly rounded, posterior angle 90°; length of base less than half length of anterior margin, length of posterior margin only slightly shorter than anterior margin.

Pelvic fin origin below origin of second dorsal and well posterior to posterior tip of first dorsal; pelvics small, their base equal to first dorsal base; anterior and posterior margins smoothly curved. Claspers large, extending beyond posterior tip of pelvic fin, inner margins orange coloured.

Body colour brown, lower surfaces of snout, lower lip, belly, and claspers black.

The name is derived from *Zantedeschia aethiopica*, the South African arum lily, after which the trawler ARUM was named.

*Material Examined*.—HOLOTYPE: South African Museum 23577. A single mature male, total length 176 mm, trawled west of Cape Town in 250-350 fathoms by M/T ARUM and presented by the mate, Mr. A. Murray.

*Relationships*.—The grouping of the Dalatiidae as a separate family within the Squaloidea, because of the absence of dorsal spines, has been criticised (Hubbs & McHugh, 1951) and reviewed (Garrick, 1956), and although this method of classification may prove to lead to the formation of an unnatural group, it must be retained as a diagnostic character until a more acceptable system is found. On the basis of the lack of dorsal spines, the somewhat posterior position of the first dorsal (snout tip to first dorsal 41.5 per cent of the total length; snout tip to first dorsal origin 52.8 per cent of distance snout to upper caudal; and pectoral origin to first dorsal origin 27.2 per cent of "trunk length"), and the nature of the teeth,

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FIGURE 1. *Euprotomicroides zantedeschia* sp. nov. a, lateral view of shark; b, ventral view of head; c, median three teeth, lower jaw; d, median three teeth, upper jaw; e, f, dermal denticles; g, left nostril.

*Euprotomicroides* falls well within the range for the Dalatiidae as given by Garrick (1956).

Although rather broadly resembling *Euprotomiscrus* Gill, *Euprotomicroides* is quite unlike any of the genera of the family Dalatiidae (Bigelow & Schroeder, 1948), including the genus *Scymnodalatias* (Garrick, 1956). *Euprotomicroides* contrasts markedly with *Isistius* and *Dalatias*, in that there is no subterminal notch in the caudal, the relative positions of the dorsal fins are quite different, the lower teeth are not serrate as they are in *Dalatias*, and the gill slits are larger. From *Heteroscymnoides*, as described by Fowler (1934), it differs in the structure and position of the fins; the epiural lobe of the caudal in *Euprotomicroides* is more strongly developed than the hypural lobe (cf. Fowler, 1934, Fig. 4, p. 236; and Bigelow & Schroeder, 1957, Fig. 16, p. 130); the first dorsal is situated more posteriorly in *Euprotomicroides*, so that the distal end of the pectoral falls short of the first dorsal origin. In *Heteroscymnoides* the snout is long and depressed, whereas in *Euprotomicroides* the snout is short and subconic. Comparisons with the published figures of *Heteroscymnoides* (Fowler, 1934; Bigelow & Schroeder, 1957) indicate that in *Euprotomicroides* the gill slits are larger, and, due to the truncate nature of the snout, the gill openings are relatively more anteriorly placed. The placoid scales are also different, and those of *Euprotomicroides* approximate the condition found in *Squaliolus*, but it may be separated from this genus by the lack of any trace of a dorsal spine in the first dorsal fin; also the difference in size of the dorsal fins is not so marked as in the latter genus. The diagnostic characters of *Scymnodalatias*, the angularly compressed snout, upper teeth with asymmetrical twisted cusps, the subterminal notch and the shape of the denticles have no counterpart in *Euprotomicroides*. The eye of *Euprotomicroides* is much larger than the eye of any of the species of *Somniosus*, and the first dorsal is smaller than the second in *Euprotomicroides*. *Euprotomicroides* may easily be separated from *Isistius* by the position of the first dorsal fin and the larger gill-rakers.

*Euprotomicroides* most resembles *Euprotomiscrus* Gill in that the snout and head are short and subconic; the first dorsal is smaller than the second dorsal, and the lobes of the caudal fin are rounded. The relative length of the lower labial grooves in the two genera is similar. However, marked differences occur in the position and comparative sizes of the dorsal fins. In *Euprotomicroides* the first dorsal is more anteriorly situated and is larger than that of *Euprotomiscrus*; the second dorsal is smaller and situated more anteriorly with respect to the pelvic origin; the caudal axis in *Euprotomicroides* is upturned to about the same extent as in *Heteroscymnoides* and quite unlike the almost straight axis of *Euprotomiscrus* (see Hubbs & McHugh, 1951, pl. IV). In *Euprotomicroides* the head is more thickly rounded, and the gill slits are much larger.

*Ecology*.—The small specimens of the family Dalatiidae appear to be pelagic sharks and in general are either known from only a single record or from several widely scattered localities. It is not known what the normal habitat of *Euprotomicroides* is, but it is very likely that it is an open bathypelagic dweller. Its depth of capture is not known; the bottom trawl in which it was caught was fishing in about 250-350 fathoms, but whether it was caught at that depth or at a lesser depth while setting or hauling the trawl is unknown.

The head has the skin abraded away in places, but this is likely to be due to the rough treatment it received in the trawl and on deck.

#### ACKNOWLEDGMENTS

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#### SUMARIO

*Euprotomicroides zantedeschia*, NUEVO GÉNERO Y ESPECIE DE TIBURÓN DALÁTIDO PIGMEO DE SUD ÁFRICA

Se describe un ejemplar único de un pequeño tiburón dalátido, con una longitud total de 176 mm. Se considera que difiere suficientemente de todos los Dalatiidae conocidos, como para merecer ser colocado en un nuevo género y especie, *Euprotomicroides zantedeschia*. Se compara este género con los otros de la familia.

#### REFERENCES

- BIGELOW, H. B. AND W. C. SCHROEDER  
1948. Fishes of the western North Atlantic. Pt. I. Mem. Sears Found. Mar. Res., 1 (1): i-xvii, 1-576.  
1957. A study of the sharks of the suborder Squaloidea. Bull. Mus. comp. Zool., 117 (1): 1-150.
- FOWLER, H. W.  
1933. Descriptions of new fishes obtained 1907-1910, chiefly in the Philippine Islands and adjacent seas. Proc. Acad. nat. Sci. Philad., 85: 239-240.
- GARRICK, J. A. F.  
1956. Studies on New Zealand Elasmobranchii Pt. V. *Scymnodalatias* n.g. based on *Scymnodon sherwoodi* Archey 1921 (Selachii). Trans. roy. Soc. New Zealand, 83 (3): 555-571.
- HUBBS, C. L. AND J. L. McHUGH  
1951. Relationships of the pelagic shark *Euprotomiscus bispinatus*, with a description of a specimen off California. Proc. Calif. Acad. Sci. 4th series, 27 (6): 159-176.